

REMARKS

Summary of Final Action

The Title of the specification is object to as being too broad.

Claims 1-6 and 13-17 remain active. Claims 7-12 having been previously cancelled.

Claims 1-6 and 13-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Plat et al.* (U.S. Patent No. 6,265,751) in view of *Chung et al.* (U.S. Patent 6,184,142) and in view of the Applicant's admitted prior art (AAPA).

Claims 1-6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Chung et al.* in view of AAPA and *Li et al.* (U.S. No. 6,423, 628).

Summary of Applicant's Response

Applicants have amended the title and claims 1 and 13.

Applicants respectfully traverse the rejections based on the prior art.

Detailed Response

Applicants have amended the title of the application as suggested by the Examiner. Applicants have also amended claims 1 and 13 as suggested by the Examiner in the Office Action to correct minor informalities therein. No new matter has been added by the amendments, the amendments are not made for reasons of patentability and no file history estoppel should be incurred.

U.S. Patent 6,265,751
to Plat is Not Prior Art

Applicants respectfully submit that the subject matter of U.S. Patent No. 6,265,751, issued to *Plat et al.*, and the invention claimed in the present application were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person, namely, AMD, the assignee of the present

application. Pursuant to 35 U.S.C. § 103(c), therefore, U.S. Patent No. 6,265,751 may not be asserted as prior art against the claims of the present application.

Although U.S. Patent No. 6,222,241, also issued to *Plat et al.*, was not relied upon in the Final Action, the subject matter of the patent and the invention claimed in the present application were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person, namely, AMD, the assignee of the present application. Pursuant to 35 U.S.C. § 103(c), therefore, U.S. Patent No. 6,222,241 may not be asserted as prior art against the claims of the present application.

Declaration Pursuant to §1.131

Applicant submits herewith Declarations of the inventors, Marina Plat and Angela Hui. The declarations are submitted pursuant to 35 CFR § 1.131 to establish conception of the invention and due diligence in reducing the invention to practice from a date prior to the effective dates of both *Plat* and *Li*. Accordingly, these references are not available as prior art against the claims of the present application.

The Cited References
Do Not Teach the Invention

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Applicants respectfully submit that the cited references fail to render the present claims obvious, because there is no suggestion or motivation to modify the methods taught by the cited references to arrive at the methods claimed in the present application. For example, *Chung* teaches to remove the photoresist after transferring the mask image to the hardmask layer but prior to etching the underlying semiconductor (see Figures 6A-B, and column 4, lines 14-55). In contrast, the present claims recite etching both the ARC layer and underlying layer prior to removing the photoresist. For example, claim 1 recites steps including:

- " . . .
(b) patterning a resist layer, the resist layer including a pattern having a plurality of apertures therein for etching a first portion of the first layer;
(c) etching the first portion of the first layer;
(d) removing the resist layer utilizing a plasma etch, the ARC layer being resistant to the plasma etch;
 . . ."

None of the cited art suggests changing the order of process steps taught by *Chung* to arrive at the order recited in the claimed methods.

With regard to selecting the thickness of the SiON layer, applicants respectfully submit that using a thickness of about 300 Angstroms as claimed is not merely the determination of optimum process conditions by routine experimentation. In semiconductors having both memory and logic circuitry, the memory cells are formed and then the logic circuitry is formed. According to the prior art, including *Chung*, the photoresist is patterned for etching the memory cells. The pattern is then transferred to the hardmask/ARC layer and the photoresist is removed (see Figures 6A-B, and column 4, lines 14-55). The wafer is then etched to form the memory cell gates (Figure 6C). However, the etchant also removes some of the hardmask/ARC layer so that the thickness of the ARC layer is reduced when the memory cells are etched. The change in thickness adversely affects the antireflective properties of the ARC layer while subsequently patterning a second layer of photoresist for the formation of the logic circuitry. A prior art solution to ARC layer thinning is to deposit a thicker ARC layer

prior to etching the memory cells, so that after the ARC layer is thinned it is still thick enough to provide adequate antireflective properties.

Indeed, *Chung* teaches to use a hard mask layer of about 500-1000 Angstroms. This is because *Chung* removes the photoresist prior to etching the low-k dielectric layers. As a result, the hard mask layer is thinned when during the first etching. To compensate *Chung* teaches starting a thicker hard mask layer, as taught by the prior art. Thus, *Chung* and the other prior art teaches away from the claimed invention.

Applicants determined that by leaving the photoresist in place while etching the underlying semiconductor the ARC layer is not damaged, e.g., 'thinned', during etching. This is not taught by the prior art, including the art of record in the present application.

Conclusion

Applicant respectfully submits that the claims of the present application, including claims 1-6 and 13-17 are now in condition for allowance. Prompt reconsideration and allowance are requested.

With the addition of no new claims, no additional filing fees are due. However, the Commissioner is hereby authorized to charge any fees or credit any overpayment to Deposit Account Number 23-2426 of WINSTEAD SECHREST & MINICK P.C.

If the Examiner has any questions or comments concerning this paper or the present application in general, the Examiner is invited to call the undersigned at (214) 745-5421.

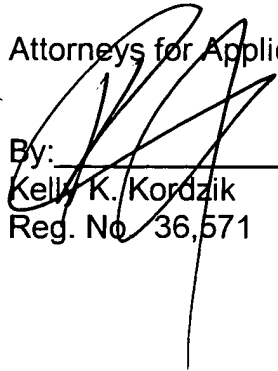
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Respectfully submitted,

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